CDC
May 15, 1998 / Vol. 47 / No. 18
MMWR™
MORBIDITY AND MORTALITY WEEKLY REPORT

Varicella-Related Deaths Among Children — United States, 1997

During the first quarter of 1998, the Texas Department of Health and the Iowa Department of Public Health notified CDC of three fatal cases of varicella (chickenpox) that occurred in children during 1997. All three children were unvaccinated. Two children contracted chickenpox from unvaccinated siblings, and the mode of exposure was unknown for the third. This report summarizes these cases and indicates that varicella-related deaths continue to occur among children in the United States despite the availability of vaccine and recommendations for its use in all susceptible children (*1,2*).

Case 1

On February 28, 1997, a previously healthy, unvaccinated 21-month-old boy developed a typical varicella rash. He had no reported exposure to varicella. On March 1, he was taken to a local emergency department (ED) with a high fever and was started on oral acetaminophen and diphenhydramine. On March 3, his primary-care physician prescribed oral acyclovir. On March 4, his mother noted a new petechial-like rash. The next morning, his primary-care physician noted lethargy, a purpuric rash, and poor perfusion. He was transferred to a local ED. Fluid resuscitation and intravenous ceftriaxone were initiated, but the child continued to deteriorate rapidly, requiring intubation, mechanical ventilation, and inotropic support with dopamine. Blood cultures were negative for bacterial pathogens. Laboratory tests indicated disseminated intravascular coagulation and severe dehydration. Approximately 1½ hours after arrival at the ED, he was transported to a tertiary-care center. Within 10 minutes of arrival, he suffered cardiac arrest and died. The death was attributed to varicella with hemorrhagic complications.

Case 2

On December 21, 1997, a 5-year-old unvaccinated boy with a history of asthma was taken to a local ED with a fever of 104.5 F (40.3 C) and a typical varicella rash in multiple stages of healing. The child was treated with antipyretic and antipruritic medications and discharged.

That evening, the boy developed mild dyspnea and was treated at home for a presumed asthma attack with metered-dose inhalers and one dose of oral prednisone. He

Varicella-Related Deaths — Continued

returned to the ED on December 22 with shortness of breath and a 4-hour history of abdominal and leg pain. On presentation to the ED, one of the patient's siblings had active varicella and another had recently recovered from varicella. Physical examination revealed numerous chickenpox lesions, one of which appeared infected. He was tachypneic, and his extremities were mottled consistent with peripheral septic emboli. Chest and abdominal radiographs revealed a right pleural effusion, pneumonia, and mild ileus. Thoracostomy produced pleural fluid containing gram-positive cocci, confirmed 8 hours later to be group A *Streptococcus* (GAS). A peripheral blood sample revealed gram-positive cocci. He was admitted to the hospital and treated with intravenous ceftriaxone, nafcillin, and acyclovir.

After admission, his breathing became labored and his extremities increasingly mottled. He rapidly developed hypotension, obtundation, and bradycardia. Despite efforts at cardiopulmonary resuscitation, the child died 5 hours after arriving at the ED. A post-mortem examination attributed the death to GAS septicemia, pneumonia, and pleural effusion, complicating varicella infection.

Case 3

On December 14, 1996, a previously healthy, unvaccinated 23-month-old boy developed fever and a typical varicella rash. Approximately 1–2 weeks earlier, his unvaccinated 4-year-old sibling had contracted varicella. He was taken to his physician on December 17 because of persistent fever and cellulitis of the left foot, and he was hospitalized on December 19 for failure to improve on an unspecified outpatient antibiotic regimen. Because his condition deteriorated despite intravenous methicillin and ceftriaxone, he was transferred to a regional hospital on December 21. Sepsis, possible viral meningoencephalitis, and mild pleural effusion were diagnosed. A cerebrospinal fluid examination revealed lymphocytic pleocytosis, and blood and urine cultures grew penicillin-resistant *Staphylococcus aureus*. Antibiotics were changed to nafcillin and gentamycin, and intravenous acyclovir was added on December 23. On December 24, the child developed an aortic insufficiency murmur, and an echocardiogram revealed a 9x9 mm vegetation on the aortic valve, consistent with bacterial endocarditis. Serial echocardiograms displayed growth of the vegetation and development of a pericardial effusion. He was transferred to a cardiac surgery center on December 26. While awaiting surgery, he developed refractive heart failure secondary to staphylococcal endocarditis. He became incoherent, probably secondary to a major embolic neurologic event, and died on January 8, 1997.

Reported by: FA Guerra, MD, R Sanchez, San Antonio Metropolitan Health Dept, San Antonio; L Tabony, MPH, M VanEgdom, J Pelosi, MPH, DM Simpson, MD, State Epidemiologist, Texas Dept of Health. K Gerdes, MD, Blank Children's Hospital, Des Moines; MP Quinlisk, MD, State Epidemiologist, Iowa Dept of Public Health. A Bowen, MPH, Univ of Wisconsin. Child Vaccine Preventable Disease Br, Epidemiology and Surveillance Div, National Immunization Program, CDC.

Editorial Note: The three cases described in this report indicate that healthy children continue to die from complications of varicella, a disease that is preventable through vaccination. Although commonly viewed as a benign disease of childhood, serious complications and death can occur following varicella. Varicella is the leading cause of vaccine-preventable deaths in children in the United States.

During 1990–1994, varicella was the underlying cause of death in an average of 43 children aged <15 years each year (CDC, unpublished data, 1998). During

Varicella-Related Deaths — Continued

1988–1995, up to 10,000 children were hospitalized each year for varicella or its complications (CDC, unpublished data, 1998). Ninety percent of the children who died did not have high-risk conditions for severe varicella. The most common severe complications from varicella among fatal cases in children are secondary bacterial infections and pneumonia. Other complications include encephalitis, hemorrhagic complications, hepatitis, arthritis, and Reye syndrome. Reports of severe invasive infections from GAS-complicating varicella have heightened awareness that varicella is a well-defined risk factor for GAS disease (*3,4*).

Varicella vaccine was licensed in the United States in March 1995, is widely available, and is recommended for routine vaccination of children aged 12–18 months and for vaccination of susceptible older children, adolescents, and adults (*1,2*). The Vaccines For Children (VFC) program provides varicella vaccine for VFC-eligible children aged >12 months who were born on or after January 1, 1983, and for VFC-eligible children aged <19 years who are family members of an immunocompromised person.

National coverage levels among children aged 19–35 months for varicella vaccine have increased from 14% during July–September 1996 to 25% during March–June 1997 (*5*). Barriers to vaccine use include the perception that varicella is a benign disease, concerns that immunity will not persist, the potential that varicella disease burden will shift to older age groups among whom the disease is more severe, and concerns about vaccine efficacy and safety (*4*). A recent study documented 100% vaccine efficacy for prevention of moderate or severe varicella and 86% for prevention of all varicella (*6*). In addition, vaccinated children who developed varicella caused by wild virus or "breakthrough disease" had very mild disease of short duration with <50 lesions (*7*). Persistence of immunity for more than 20 years post vaccination has been demonstrated (*8*). As disease incidence and exposure to wild virus declines, continuing surveillance will determine the need for and timing of additional doses of vaccine.

To monitor the impact of varicella vaccination programs throughout the United States, varicella surveillance is needed, and surveillance for varicella deaths in all states is a key first step in this process. States also are encouraged to develop additional sustainable surveillance systems, including monitoring hospitalizations and establishing statewide aggregate reporting for cases by schools, day care centers, and/or health-care provider offices, and to consider instituting vaccine requirements for day care and school entry (*1*).

Efforts to increase routine and catch-up varicella vaccination among children should include educating health-care providers that deaths and severe morbidity from varicella are preventable (*1,2*). Policies that delay vaccination of susceptible children until adolescence accept the considerable disease burden that occurs among children aged 2–11 years. The most effective vaccination strategy focuses on vaccinating children routinely at age 12–18 months and vaccinating all susceptible older children and adolescents. Children have the highest disease incidence and are the group that serve as the primary source of transmission of varicella to groups at higher risk for severe disease, including adults (*9*) and persons who are not eligible for vaccination. Most deaths and severe morbidity from varicella in children and in adults can be prevented by implementing recommended policies for childhood vaccination.

Varicella-Related Deaths — Continued

References
1. CDC. Prevention of varicella: recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 1996;45(no. RR-11).
2. American Academy of Pediatrics, Committe on Infectious Diseases. Recommendations for the use of live attenuated varicella vaccine. Pediatrics 1995;95:791–6.
3. CDC. Outbreak of invasive group A *Streptococcus* associated with varicella in a childcare center—Boston, Massachusetts, 1997. MMWR 1997:46:944–8.
4. Davies D, McGeer A, Schwartz B, et al. Invasive group A streptococcus infections in Ontario, Canada. N Engl J Med 1996;335:547–54.
5. CDC. National, state, and urban area vaccination coverage levels among children aged 19–35 months—United states, July 1996–June 1997. MMWR 1998;47:108–16.
6. Chew D, Hofmann J, O'Donnell C, Finelli L. Physician attitudes and practices regarding varicella vaccine in New Jersey [Abstract]. In: Program and abstracts of the 36th Interscience Conference on Antimicrobial Agents and Chemotherapy. Washington, DC: American Society for Microbiology, 1996:278.
7. Izurieta HS, Strebel PM, Blake PA. Postlicensure effectiveness of varicella vaccine during an outbreak in a child care center. JAMA 1997;278:1495–9.
8. Asano Y, Suga S, Yoshikawa T, et al. Experience and reason: twenty-year follow-up of protective immunity of the Oka strain live varicella vaccine. Pediatrics 1994;94:524–6.
9. CDC. Varicella-related deaths among adults—United States, 1997. MMWR 1997;46:409–12.

Pregnancy-Related Death Associated with Heparin and Aspirin Treatment for Infertility, 1996

In 1996, a 38-year-old nulliparous woman died from complications of a cerebral hemorrhage. She was approximately 9 weeks' pregnant with triplets at the time of her death. The patient had undergone in vitro fertilization (IVF) and was being treated with anticoagulants (heparin and aspirin) and intravenous immunoglobulin at the time of her death. This report summarizes the investigation of this case by state and county health departments with assistance from CDC.

The patient had undergone 3 years of infertility therapy, including the use of clomiphene citrate with intrauterine insemination, before beginning IVF in 1995. She had no history of recurrent pregnancy loss at initiation of IVF. Her infertility workup included a normal hysterosalpingogram; her husband had a normal semen analysis. An autoantibody screen revealed positive antithyroid antibodies (antimicrosomal [76.0 µg/mL] and antithryroglobulin [19.9 µg/mL]; normal: <0.5 µg/mL for both assays). Antiphospholipid antibodies were negative. In 1985, she had a transphenoidal resection of a pituitary adenoma, with normal prolactin levels thereafter.

She underwent three IVF cycles (ovulation induction, IVF, and embryo transfer). The first ended with a spontaneous abortion at 8 weeks in 1995; the second IVF cycle did not result in a pregnancy; and the third cycle resulted in a pregnancy with triplets in 1996. The patient was treated with estrogen and progesterone during each pregnancy. In addition, with each IVF cycle she received 5000 units heparin subcutaneously twice a day, 81 mg aspirin daily, and intravenous gamma globulin each month. Platelets and prothrombin time (PT) and partial thromboplastin time (PTT) were normal throughout her treatment.

Pregnancy-Related Death — Continued

During her ninth week of pregnancy, the patient experienced an acute headache, anxiety, and nausea while visiting a clinic. She was transferred to a general hospital and lost consciousness en route. On admission to the hospital, she underwent immediate radiologic and neurosurgic evaluation. Her platelets and PT and PTT were normal. Neurosurgery identified a hemorrhagic arteriovenous malformation, which was surgically clipped. A postoperative computerized axial tomography (CAT) scan revealed no rebleeding, but her condition worsened. Massive cerebral swelling could not be controlled, and her condition became critical. On her third day of hospitalization, she was pronounced brain-dead, and life support was discontinued the following day.

Reported by: The Executive Council of the Society for Assisted Reproductive Technology, Birmingham, Alabama. Women's Health and Fertility Br and Pregnancy and Infant Health Br, Div of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion; and an EIS officer, CDC.

Editorial Note: CDC, in collaboration with state health departments, maintains a pregnancy-related mortality surveillance system. In 1990, CDC received reports of 417 pregnancy-related deaths in the United States. A pregnancy-related death is one that occurs during or within 1 year of pregnancy and was caused by the pregnancy or its complications. No national surveillance system exists for morbidity associated with infertility therapy.

Treatment of IVF patients with immunotherapy (anticoagulation or immunoglobulin) is aimed at preventing early pregnancy loss. Heparin and aspirin therapy substantially reduces the risk for recurrent spontaneous abortion (more than two pregnancy losses) for women with elevated antiphospholipid antibodies (APA) (*1*) by modifying the effect of APA on platelet activity, which can cause placental thrombosis and lead to fetal loss (*2*). Heparin and aspirin are widely used in the United States to treat women with recurrent spontaneous abortion and APA. However, the woman described in this report had no antiphospholipid antibodies and no history of recurrent spontaneous abortion at the initiation of her infertility therapy.

Two recent studies have investigated the role of treating IVF patients with heparin and aspirin to prevent early pregnancy loss. One study documented higher pregnancy rates among women with APA following IVF cycles treated with heparin and aspirin (*3*). A prospective nonrandomized study did not demonstrate substantially higher pregnancy rates among women with APA undergoing IVF when treated with heparin and aspirin (*4*). A randomized prospective study investigating the efficacy of heparin and aspirin in women undergoing IVF is under way (*4*).

Anticoagulation therapy can increase the risk for fatal hemorrhagic stroke (*5,6*). The inhibition of platelet activity with aspirin doses lower than 81 mg daily are well documented (*7*). Although heparin decreases the risk for death from pulmonary embolism in surgical patients, it has been associated with increased postoperative bleeding (*8*). A meta-analysis of randomized clinical trials of low-dose heparin (5000 units/twice daily) to prevent thromboembolism demonstrated an increase in wound hematoma formation associated with heparin treatment (*9*). In surgical patients receiving heparin, the concomitant use of aspirin has been associated with increased risk for serious bleeding (*10*).

Although data about the risks and benefits of anticoagulation and immunoglobulin therapy in IVF patients are limited, use of this therapy is becoming more common in

Pregnancy-Related Death — Continued

the United States. Neither aspirin or heparin, alone or in combination, are approved by the Food and Drug Administration (FDA) for this use. In July 1997, a survey of medical practices that provide assisted reproductive technology services indicated that combination therapies of heparin and aspirin for infertility treatment were used at least once by 74% of respondents (Society for Assisted Reproductive Technology, unpublished data, 1997). Of those providing immunotherapy treatment, 94% reported that they considered women who had had recurrent spontaneous abortions as potential candidates for anticoagulation treatment. In addition, 49% considered women who previously had an unsuccessful IVF attempt as potential candidates for immunologic treatment, and 19% considered new IVF patients as potential candidates for therapy.

This case is the first reported pregnancy-related death associated with the use of heparin and aspirin for infertility. The patient died from a cerebral hemorrhage associated with a congenital arteriovenous malformation. Although a causal relation between anticoagulation and hemorrhage from an arteriovenous malformation cannot be established, pregnant women have the risks for bleeding associated with anticoagulation therapy found in the general population (cerebrovascular accidents, gastric ulcers, and trauma) in addition to unique hemorrhagic risks such as ectopic pregnancy. Both heparin and aspirin therapy have been associated with increased risks for and severity of bleeding. The patient in this report did not have recurrent spontaneous abortions or a history of antiphospholipid antibodies, widely accepted as indications for heparin and aspirin therapy. Because the potential for bleeding exists with heparin and aspirin, the risks for and benefits of anticoagulation therapy to improve success rates in IVF patients require vigorous scientific investigation before being accepted as routine practice.

The regular monitoring of all pregnancy-related deaths is essential to the reproductive health of women. To further assess the potential health threat of anticoagulation therapy in the treatment of infertility, CDC requests that deaths or severe morbidity associated with the use of heparin and aspirin for the prevention of pregnancy loss be reported to CDC, telephone (770) 488-5372, or to FDA's MedWatch, telephone (800) 332-1088. Until the results of further studies are available, women undergoing IVF and their health-care providers should carefully review all information about the risks and benefits of heparin and aspirin therapy.

References

1. Kutteh WH. Antiphospholipid antibody-associated recurrent pregnancy loss: treatment with heparin and low-dose aspirin is superior to low-dose aspirin alone. Am J Obstet Gynecol 1996;174:1584–89.
2. Silver RM, Branch DW. Recurrent miscarriage: autoimmune considerations. Clin Obstet Gynecol 1994;37:745–60.
3. Sher G, Feinman M, Zouves C, et al. High fecundity rates following in-vitro fertilization and embryo transfer in antiphospholipid antibody seropositive women treated with heparin and aspirin. Hum Reprod 1994;9:2278–83.
4. Kutteh WH, Yetman DL, Chantilis SJ, Crain J. Effect of antiphospholipid antibodies in women undergoing in-vitro fertilization: role of heparin and aspirin. Hum Reprod 1997;12:1171–5.
5. The SALT Collaborative Group. Swedish Aspirin Low-dose Trial (SALT) of 75 mg aspirin as secondary prophylaxis after cerebrovascular ischaemic events. Lancet 1991;338:1345–9.
6. Steering Committee of the Physicians Health Study Research Group. Final report on the aspirin component of the ongoing Physicians' Health Study. N Engl J Med 1989;321;129–35.
7. Patrignani P, Filabozzi P, Patrono C. Selective cumulative inhibition of platelet thromboxane production by low-dose aspirin in healthy subjects. J Clin Invest 1982;69:1366–72.

Pregnancy-Related Death — Continued

8. Collins R, Scrimgeour A, Yusuf S, Peto R. Reduction in fatal pulmonary embolism and venous thrombosis by perioperative administration of subcutaneous heparin: overview of results of randomized trials in general, orthopedic, and urologic surgery. N Engl J Med 1988;318: 1162–73.
9. Clagett GP, Reisch JS. Prevention of venous thromboembolism in general surgical patients: results of a meta-analysis. Ann Surg 1988;208:227–40.
10. Walker AM, Jick H. Predictors of bleeding during heparin therapy. JAMA 1980;244:1209–12.

Population-Based Survey for Drug Resistance of Tuberculosis — Mexico, 1997

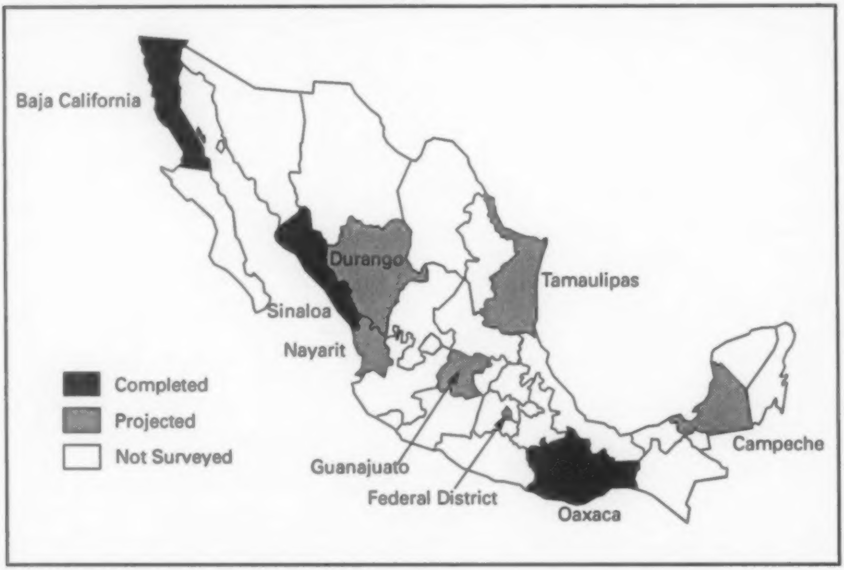
The World Health Organization (WHO) estimates that 90 million cases of tuberculosis (TB), resulting in 30 million deaths, will occur during the 1990s (*1*). To address this problem, WHO has recommended a comprehensive strategy of directly observed treatment, short-course (DOTS)* (*2*). Although DOTS results in cure rates of ≥80% (*3*), the worldwide emergence of strains of *Mycobacterium tuberculosis* (MTB) resistant to antimycobacterial agents threatens this strategy for TB control (*2*). In 1994, WHO and the International Union Against Tuberculosis and Lung Disease (IUATLD) proposed the establishment of a global surveillance program to monitor drug resistance (*2*). In 1997, the Secretary of Health of Mexico, in collaboration with CDC, developed and implemented a national survey of drug resistance for TB as part of the global project on TB drug resistance. This report describes study results for three states in Mexico (Baja California, Oaxaca, and Sinaloa) and presents the first population-based TB drug-resistance data available for that country.

For this study, the 31 states and Federal District of Mexico were categorized by reported TB incidence in 1994 into three strata (high, medium, and low incidence). Nine of these 32 areas were randomly chosen in proportion to the number of cases reported in each strata. Baja California (high), Sinaloa (high), and Oaxaca (medium) were selected as the first of the nine to participate in the survey (Figure 1). Cases were enrolled from two of the country's five major public-sector health-care agencies, the Secretaria de Salud Administracion (Secretary of Health) (SSA) and the Instituto Mexicano de Seguro Social (Mexican Institute of Social Security) (IMSS); these two agencies together provide health-care service to approximately 80% of the population and diagnose and manage 90% of reported TB cases. During January–April 1997, physicians, epidemiologists, and laboratory workers from these agencies in all three states received extensive training from SSA in conducting the survey. During April 1–October 31, physicians completed patient enrollment forms for all patients submitting at least one sputum sample for evaluation for pulmonary TB. All acid-fast bacilli (AFB) smear-positive samples were sent to the state laboratories for inoculation onto Lowenstein-Jensen media and were forwarded to the Instituto Nacional de Diagnostico y Referencia Epidemiologicos (National Diagnostic and Epidemiologic Reference Institute) (INDRE) in Mexico City for species identification and testing for drug susceptibility to isoniazid, rifampin, pyrazinamide, streptomycin, and ethambutol using the

*DOTS consists of 1) committing to a sustainable national TB program; 2) detecting cases among symptomatic patients self-reporting to health services, using smear microscopy; 3) administering standardized short-course chemotherapy with direct observation of treatment; 4) establishing a regular drug supply of essential anti-TB drugs; and 5) establishing and maintaining a standardized recording and reporting system that allows assessment of treatment results.

Tuberculosis — Continued

FIGURE 1. States surveyed or projected to be surveyed for multidrug-resistant *Mycobacterium tuberculosis* — Mexico, 1997



radiometric method (*4*). The reference institute and CDC exchanged and tested 20 MTB isolates on two separate occasions for quality-control monitoring; there was a discrepancy in one drug for one isolate, for an accuracy rate of 97.5%.

In this analysis, resistance to one or more drugs was defined as resistance to isoniazid, rifampin, or pyrazinamide—the three drugs that constitute first-line treatment in Mexico. Resistance to one or more drugs was defined as primary for patients who had never taken anti-TB drugs and as acquired for patients reporting previous treatment with anti-TB drugs. Multidrug-resistant (MDR) TB was defined as resistance to at least isoniazid and rifampin (*2*). Primary resistance was considered to reflect infection with a resistant organism, and acquired resistance was considered to reflect the development of resistance during the course of previous therapy.

During the study period, 816 patients were officially reported with AFB smear-positive pulmonary TB: 351 from Baja California, 110 from Oaxaca, and 355 from Sinaloa (Table 1). Of these, 602 (74%) were enrolled in the study; MTB isolates were available for drug-susceptibility testing from 440 (73%) patients. Of the remaining specimens, 22% had no growth, 4% were contaminated, and 1% had nontuberculous mycobacteria. Of patients with MTB isolates, 24% had a history of prior TB treatment. The median age of patients was 36 years (range: 10–99 years); 69% were male. No difference was observed between patients with culture-positive and culture-negative isolates by age or prior history of TB.

Tuberculosis — Continued

Primary resistance to one or more of the three current first-line drugs used in Mexico was 12%; acquired resistance was 50% (Table 2). Levels for both primary and acquired drug resistance did not differ significantly by state or by patient age or sex. Levels of combined resistance (primary and acquired), which represent an approximation of the overall level of drug resistance to isoniazid, rifampin, pyrazinamide, ethambutol, or streptomycin the community, were 26% (113 of 440) for one or more of the five drugs, 18% (79 of 440) for isoniazid resistance, and 6% (28 of 440) for MDR TB.

TABLE 1. Number of acid-fast bacilli smear-positive pulmonary tuberculosis (TB) cases, number and percentage of enrolled patients with smear positive pulmonary TB, and number and percentage of isolates recovered from those patients — selected states, Mexico, April–October, 1997

State	No. cases reported*	Patients enrolled in study		Isolates recovered†	
		No.	(%)	No.	(%)
Baja California	351	298	(85)	216	(72)
Oaxaca	110	159	(>100)§	104	(65)
Sinaloa	355	145	(41)	120	(83)
Total	**816**	**602**	**(74)**	**440**	**(73)**

*Source: Secretary of Health of Mexico.
†*Mycobacterium tuberculosis* isolates available for drug susceptibility testing.
§Because of underreporting and reporting delays, some patients enrolled in the study may not have been officially reported.

TABLE 2. Number and percentage of sputum-smear positive pulmonary tuberculosis (TB) patients with drug-resistant *Mycobacterium tuberculosis* isolates, by drug to which the isolate was resistant and by TB treatment history† — Baja California, Oaxaca, and Sinaloa states, Mexico, April–October 1997

Drug	All cases (n=440)		Previous treatment*: No† (n=308)		Previous treatment*: Yes§ (n=99)		Prevalence rate ratio¶	(95% CI**)
	No.	(%)	No.	(%)	No.	(%)		
Isoniazid	79	(18)	35	(11)	41	(41)	3.6	(2.4– 5.4)
Rifampin	37	(8)	7	(2)	27	(27)	12.0	(5.4–26.7)
Pyrazinamide	23	(5)	4	(1)	18	(18)	14.0	(4.9–40.4)
Ethambutol	24	(6)	9	(3)	14	(14)	4.8	(2.1–10.8)
Streptomycin	66	(15)	34	(11)	28	(28)	2.6	(1.6– 4.0)
Any first-line drug††	90	(21)	38	(12)	49	(50)	4.0	(2.8– 5.7)
Multidrug-resistant§§	28	(6)	5	(2)	20	(20)	12.4	(4.8–32.3)
Five drugs¶¶	10	(2)	2	(1)	8	(8)	12.4	(2.7–57.6)

*Patients with culture-positive TB for whom complete data about treatment history was available; n=407.
†Isolates from persons who reported no history of TB treatment are considered to have primary drug resistance.
§Isolates from persons who reported a history of previous treatment with anti-TB drugs are considered to have acquired drug resistance.
¶Rate in the previously treated group divided by the rate in the previously untreated group.
**Confidence interval for the prevalence rate ratio.
††Resistance to Isoniazid, rifampin, or pyrazinamide.
§§Resistance to at least isoniazid and rifampin.
¶¶Resistance to Isoniazid, rifampin, pyrazinamide, ethambutol, and streptomycin.

Tuberculosis — Continued

Patients with acquired resistance were significantly more likely than patients with primary resistance to have resistance to one or more of the three first-line drugs (prevalence rate ratio [PRR]=4.0; 95% confidence interval [CI]=2.8–5.7), to have isoniazid resistance (PRR=3.6; 95% CI=2.5–5.4), and to have MDR TB (PRR=12.4; 95% CI=4.8–32.3).

Reported by: R Acosta Bermudez, P Acosta Blanco, G Anzaldo Flores, S Balandrano Campos, C Barron Rivero, D Casteneda Nava, P Contreras Ramos, A Flisser, MD, G Jaime Anzaldo, P Kuri Morales, MD, AR Marquez Fiol, MD, L Olivares Delgado, C Ruíz Matus, MD, AJ Santaella Solis, MD, JI Santos Preciado, MD, F Soriano Miranda, R Tapia Conyer, MD, Secretary of Health; A Zarate Aguilar, MD, IH Fernandez Garate, MD, JA Rivera, MD, J Navarrete Espinoza, MD, Mexican Institute of Social Security, Mexico City. JE Cornejo, MD, J Islas Torres, MD, D Ontiveros, MD, J Robledo Vasquez, MD, M Rodriguez Lomeli, MD, E Romo Rodriguez, A Zimbron, MD, ML Volcker, Baja California State Dept of Health. A Beltran Zazueta, MD, P Ferreiro Gastelum, MD, E Llausas Magana, S Pantoja Olvera, E Quinones Mejia, Sinaloa State Dept of Health. F Aguirre Gordillo, MD, MR Castellanos Morales, MD, P Diaz Garcia, MD, A Vasquez Hernandez, Oaxaca State Dept of Health. TB/Mycobacteriology Br, Div of AIDS, STD, and TB Laboratory Research, National Center for Infectious Diseases; International Activity, Div of Tuberculosis Elimination, National Center for HIV, STD, and TB Prevention; and an EIS Officer, CDC.

Editorial Note: This is the first population-based study of TB drug resistance from Mexico. Compared with results from 35 countries participating in the WHO/IUATLD global project on TB drug-resistance surveillance during 1994–1997, Mexico would have had the ninth highest level for primary resistance to at least one of the four first-line drugs (isoniazid, rifampin, ethambutol, and/or streptomycin) at 18% (pyrazinamide resistance was not evaluated). The United States ranked 14th with a level of 12% (*2*).

In 1996, 8% of TB cases in the United States occurred in persons born in Mexico (*5*). The 1993–1996 U.S. surveillance data about persons with TB who were born in Mexico and the findings from the survey of persons born in Mexico described in this report indicate similar rates among patients for primary isoniazid resistance (9% and 11%, respectively) and primary MDR TB (2% and 2%, respectively) (*6*).

The findings in this report are subject to at least three limitations. First, although surveillance for TB improved in the three surveyed states during the study period, the ability to assess data representativeness is limited by underreporting and notification delays. For example, the study in Oaxaca enrolled more patients than the number of persons officially reported as having smear-positive pulmonary TB. Second, 26% of the persons reported to the SSA with AFB smear-positive TB were not enrolled in the study, and 27% of the samples submitted could not be cultured. However, patients with positive cultures did not differ significantly from those with negative cultures by age or prior treatment history. Third, findings presented here are from only three of 31 states in Mexico and the Federal District; although the states are geographically dispersed, they may not be representative of the nation.

The findings of this survey have lead to improved TB control in Baja California, Oaxaca, and Sinaloa. All three state laboratories now have implemented the capacity to culture for MTB. Although smears rather than cultures are recommended by WHO as the basis of initial TB diagnosis in countries with limited resources, the newly developed culture capacity in the three states will be useful in surveillance efforts and in the management of cases not responding to routinely recommended treatment regimens.

Tuberculosis — Continued

In part as a result of this survey, the Secretary of Health of Mexico, in an effort to limit increases in drug resistance, is planning to initiate a four-drug treatment regimen by adding ethambutol to the current three-drug regimen. Four-drug regimens are recommended by CDC and the American Thoracic Society for communities with primary isoniazid resistance of ≥4% (*7*). A second action to limit drug resistance that is being implemented by the Secretary of Health is to expand the DOTS program to the entire country. In addition to preventing the development of drug resistance, national strategies that are feasible in Mexico are needed to treat patients with MDR TB. As changes are made in the TB program, trends in MTB drug resistance will need to be monitored by implementing ongoing surveillance or performing periodic surveys. Further collaborative international efforts will be needed to improve TB control in the United States and Mexico.

References

1. Raviglione MC, Snider DE Jr, Kochi A. Global epidemiology of tuberculosis: morbidity and mortality of a worldwide epidemic. JAMA 1995;273:220–6.
2. World Health Organization. Anti-tuberculosis drug resistance in the world: the WHO/IUATLD Global Project on Anti-tuberculosis Drug Resistance Surveillance, 1994–1997. Geneva, Switzerland: WHO Global Tuberculosis Programme, 1997; report no. WHO/TB/97.229.
3. World Health Organization. Treatment of tuberculosis: guidelines for national programmes. 2nd ed. Geneva, Switzerland: World Health Organization, 1997; report no. WHO/TB/97.220.
4. Inderlied CB, Salfinger M. Antimicrobial agents and susceptibility testing: mycobacteria. In: Murray PR, Baron EJ, Pfaller MA, Tenover FC, Yolken RH, eds. Manual of clinical microbiology. 6th ed. Washington, DC: ASM Press, 1995:1392–6.
5. CDC. Reported tuberculosis in the United States, 1996. Atlanta, Georgia: US Department of Health and Human Services, Public Health Service, CDC, 1997.
6. Granich R, Moore M, Binkin N, McCray E. Anti-TB drug resistance among U.S. foreign-born TB cases, 1993–1996. Vancouver, British Columbia, Canada: Third Annual Meeting, North American Region, Union Against Tuberculosis and Lung Disease, February 26–28, 1998. (Abstract D.FIR.9.)
7. American Thoracic Society/CDC. Treatment of tuberculosis and tuberculosis infection in adults and children. Am J Respir Crit Care Med 1994;149:1359–74.

Notice to Readers

Satellite Broadcast on Antimicrobial Use and Resistance

Antimicrobial Use and Resistance: Solutions to the Problem, a live, interactive satellite broadcast, will be held Thursday, August 20, 1998, from 9 a.m. to 11:30 a.m. eastern daylight time (EDT) with a repeat broadcast from 1 p.m. to 3:30 p.m. EDT. Cosponsors are CDC, the National Foundation for Infectious Diseases, in collaboration with the Association for Professionals in Infection Control and Epidemiology and the Society for Healthcare Epidemiology of America.

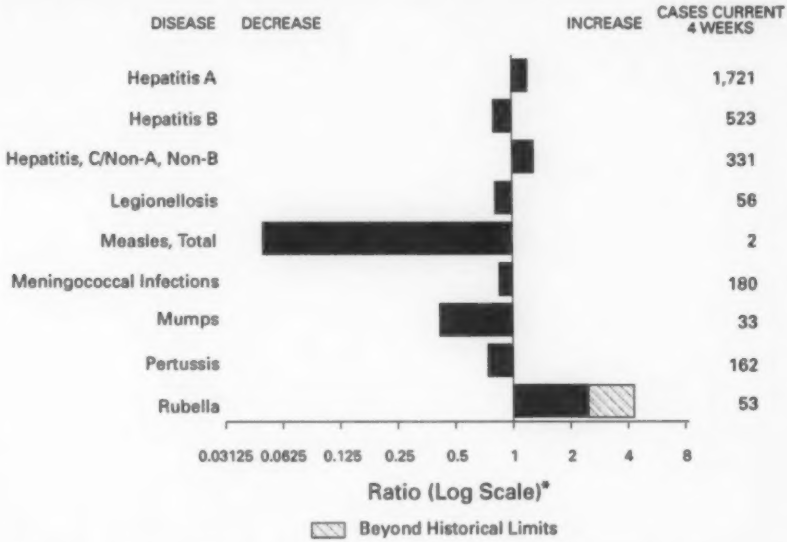
This broadcast will provide an overview of the increasing problem and emergence of antimicrobial resistant pathogens and will describe methods for the surveillance of antimicrobial resistance and assessment of antimicrobial use. Participants also will learn various strategies to improve antimicrobial use and prevent and control the spread of antimicrobial resistant pathogens. Continuing education credits will be awarded for various professions based on 2.5 hours of instruction.

Notice to Readers — Continued

This course is designed for physicians, nurses, infection-control professionals, pharmacists, laboratorians, hospital administrators, and others involved in the prevention and control of antimicrobial resistant pathogens.

Registration information is available through CDC's fax information system, telephone (888) 232-3299; request document number 130018.

FIGURE I. Selected notifiable disease reports, comparison of provisional 4-week totals ending May 9, 1998, with historical data — United States



*Ratio of current 4-week total to mean of 15 4-week totals (from previous, comparable, and subsequent 4-week periods for the past 5 years). The point where the hatched area begins is based on the mean and two standard deviations of these 4-week totals.

TABLE I. Summary — provisional cases of selected notifiable diseases, United States, cumulative, week ending May 9, 1998 (18th Week)

	Cum. 1998		Cum. 1998
Anthrax	-	Plague	-
Brucellosis	7	Poliomyelitis, paralytic¶	-
Cholera	-	Psittacosis	13
Congenital rubella syndrome	1	Rabies, human	-
Cryptosporidiosis*	607	Rocky Mountain spotted fever (RMSF)	24
Diphtheria	-	Streptococcal disease, invasive Group A	829
Encephalitis: California*	-	Streptococcal toxic-shock syndrome*	25
eastern equine*	-	Syphilis, congenital**	50
St. Louis*	-	Tetanus	5
western equine*	-	Toxic-shock syndrome	52
Hansen Disease	43	Trichinosis	2
Hantavirus pulmonary syndrome*†	2	Typhoid fever	102
Hemolytic uremic syndrome, post-diarrheal*	8	Yellow fever	-
HIV infection, pediatric*§	88		

-:no reported cases
*Not notifiable in all states.
† Updated weekly from reports to the Division of Viral and Rickettsial Diseases, National Center for Infectious Diseases (NCID).
§ Updated monthly to the Division of HIV/AIDS Prevention–Surveillance and Epidemiology, National Center for HIV, STD, and TB Prevention (NCHSTP), last update April 26, 1998.
¶ One suspected case of polio with onset in 1998 has also been reported to date.
**Updated from reports to the Division of STD Prevention, NCHSTP.

TABLE II. Provisional cases of selected notifiable diseases, United States, weeks ending May 9, 1998, and May 3, 1997 (18th Week)

Reporting Area	AIDS		Chlamydia		*Escherichia coli* O157:H7		Gonorrhea		Hepatitis C/NA,NB	
					NETSS[†]	PHLIS[§]				
	Cum. 1998*	Cum. 1997	Cum. 1998	Cum. 1997	Cum. 1998	Cum. 1998	Cum. 1998	Cum. 1997	Cum. 1998	Cum. 1997
UNITED STATES	16,097	20,911	174,456	157,059	288	144	102,944	95,185	1,502	973
NEW ENGLAND	489	666	6,567	6,017	34	21	1,730	2,042	16	27
Maine	10	25	326	329	1	-	14	14	-	-
N.H.	14	8	318	264	6	4	31	48	-	3
Vt.	10	16	128	136	-	-	8	18	-	1
Mass.	211	279	3,004	2,474	15	14	736	783	16	21
R.I.	40	55	816	723	3	1	112	182	-	2
Conn.	204	283	1,965	2,091	9	2	829	997	-	-
MID. ATLANTIC	4,607	6,654	21,854	19,434	24	8	12,008	12,214	121	104
Upstate N.Y.	545	1,122	N	N	17	-	1,937	2,091	105	82
N.Y. City	2,631	3,292	12,578	10,600	2	4	5,382	4,909	-	-
N.J.	823	1,450	2,743	3,589	5	4	1,806	2,497	-	-
Pa.	608	790	6,533	5,245	N	-	2,883	2,717	16	22
E.N. CENTRAL	1,299	1,540	33,492	24,900	48	18	22,150	14,658	163	243
Ohio	242	305	8,235	7,799	16	3	4,968	4,765	5	5
Ind.	275	301	2,706	3,043	6	7	1,769	2,103	3	6
Ill.	495	504	12,170	3,882	14	-	8,541	1,957	7	36
Mich.	218	347	7,852	6,464	12	4	5,904	4,306	148	182
Wis.	69	83	2,529	3,712	N	4	968	1,527	-	14
W.N. CENTRAL	288	434	10,205	10,654	36	24	4,946	4,659	96	23
Minn.	50	79	1,654	2,363	17	12	570	818	-	-
Iowa	14	58	1,496	1,708	2	-	461	446	9	11
Mo.	139	208	4,062	3,937	6	11	2,903	2,581	84	3
N. Dak.	4	3	290	314	1	1	29	23	-	2
S. Dak.	7	2	582	376	1	-	101	38	-	-
Nebr.	32	34	885	683	4	-	328	253	1	1
Kans.	42	50	1,236	1,273	5	-	554	500	2	6
S. ATLANTIC	4,121	5,123	36,028	28,929	[illegible]	12	29,359	27,945	62	72
Del.	44	69	885	612	-	1	471	377	-	-
Md.	488	582	2,810	2,420	9	4	3,137	4,368	3	6
D.C.	343	343	N	N	-	-	1,237	1,432	-	-
Va.	284	420	3,169	3,831	N	5	2,141	2,788	1	7
W. Va.	36	27	907	1,087	N	-	246	333	3	3
N.C.	273	282	7,776	6,001	7	2	6,649	5,685	10	20
S.C.	283	264	6,565	3,964	1	-	4,207	3,465	-	17
Ga.	501	689	8,027	2,574	2	-	6,666	3,625	8	-
Fla.	1,889	2,447	5,889	8,440	6	-	4,606	5,874	37	19
E.S. CENTRAL	591	603	12,477	11,454	22	7	11,714	11,589	49	124
Ky.	87	60	2,153	2,233	5	-	1,203	1,515	7	5
Tenn.	184	278	4,271	4,268	13	7	3,570	3,639	39	74
Ala.	183	153	3,322	2,764	4	-	4,168	3,804	3	5
Miss.	137	112	2,731	2,189	-	-	2,773	2,631	-	40
W.S. CENTRAL	1,953	2,038	21,602	19,822	16	4	12,683	13,054	441	88
Ark.	71	83	1,148	920	1	1	1,094	1,561	-	1
La.	333	403	4,073	2,582	-	-	3,404	2,430	1	65
Okla.	106	116	3,639	2,579	2	3	1,941	1,641	1	4
Tex.	1,443	1,436	12,742	13,741	13	-	6,244	7,422	439	18
MOUNTAIN	526	621	6,657	8,849	23	16	2,528	2,681	280	116
Mont.	13	16	352	311	1	-	20	14	4	4
Idaho	12	18	640	520	2	-	53	39	80	15
Wyo.	2	11	245	178	-	-	11	20	127	40
Colo.	91	170	-	1,557	3	3	839	683	10	14
N. Mex.	76	59	1,284	1,232	6	4	248	484	30	26
Ariz.	200	157	3,315	3,464	N	5	1,213	1,089	1	11
Utah	45	46	568	541	7	1	52	62	16	2
Nev.	87	144	253	1,046	4	3	92	290	12	4
PACIFIC	2,223	3,232	25,584	27,000	59	34	5,826	6,343	274	176
Wash.	165	240	3,918	3,184	15	11	660	708	8	9
Oreg.	64	128	1,955	1,636	18	17	269	248	2	2
Calif.	1,947	2,822	18,365	21,111	26	3	4,661	5,067	222	111
Alaska	11	18	690	491	-	-	107	159	1	-
Hawaii	36	24	636	579	N	3	129	161	41	54
Guam	-	2	8	151	N	-	2	20	-	-
P.R.	666	517	U	U	-	U	144	229	-	32
V.I.	15	28	N	N	N	U	-	-	-	-
Amer. Samoa	-	-	-	-	N	U	-	-	-	-
C.N.M.I.	-	-	N	N	N	U	7	13	-	2

N: Not notifiable U: Unavailable -: no reported cases C.N.M.I.: Commonwealth of Northern Mariana Islands

*Updated monthly to the Division of HIV/AIDS Prevention–Surveillance and Epidemiology, National Center for HIV, STD, and TB Prevention, last update April 26, 1998.

[†]National Electronic Telecommunications System for Surveillance.

[§]Public Health Laboratory Information System.

TABLE II. (Cont'd.) Provisional cases of selected notifiable diseases, United States, weeks ending May 9, 1998, and May 3, 1997 (18th Week)

Reporting Area	Legionellosis		Lyme Disease		Malaria		Syphilis (Primary & Secondary)		Tuberculosis		Rabies, Animal
	Cum. 1998	Cum. 1997	Cum. 1998	Cum. 1997	Cum. 1998	Cum. 1997	Cum. 1998	Cum. 1997	Cum. 1998*	Cum. 1997	Cum. 1998
UNITED STATES	353	295	1,232	1,024	350	442	2,353	3,037	1,955	5,333	2,350
NEW ENGLAND	20	24	252	185	17	19	27	59	90	128	466
Maine	1	1	-	3	1	1	1	-	U	11	78
N.H.	2	3	7	4	3	2	1	-	2	1	33
Vt.	1	3	2	2	-	1	1	-	1	-	26
Mass.	6	10	69	41	11	13	19	32	71	66	141
R.I.	4	3	25	32	2	2	-	-	16	7	30
Conn.	6	4	149	103	-	-	5	27	U	43	158
MID. ATLANTIC	72	50	768	671	93	117	84	154	178	977	524
Upstate N.Y.	24	12	470	80	27	19	9	17	U	125	366
N.Y. City	10	2	-	52	41	67	19	29	U	509	U
N.J.	3	5	55	166	16	21	18	71	178	201	67
Pa.	35	31	243	373	9	10	38	37	U	142	91
E.N. CENTRAL	116	116	23	13	24	45	366	268	148	550	16
Ohio	52	56	22	6	2	4	60	88	5	106	15
Ind.	16	15	1	4	1	4	54	62	U	47	-
Ill.	12	5	-	1	6	20	100	24	143	281	-
Mich.	23	29	-	2	14	14	72	35	U	77	-
Wis.	13	11	U	U	1	3	20	59	U	39	1
W.N. CENTRAL	27	22	10	9	20	9	56	65	65	157	213
Minn.	3	1	3	7	8	4	-	13	U	43	40
Iowa	2	3	6	-	2	2	-	3	U	20	43
Mo.	10	2	-	1	7	2	45	33	52	59	12
N. Dak.	-	2	-	-	1	-	-	-	U	2	42
S. Dak.	-	1	-	-	-	-	-	-	7	2	33
Nebr.	9	9	-	1	-	1	4	-	3	4	1
Kans.	3	4	1	-	2	-	7	16	U	27	42
S. ATLANTIC	46	35	122	101	86	84	994	1,201	332	882	772
Del.	6	5	-	20	1	2	9	8	-	9	17
Md.	9	10	94	67	31	27	228	350	90	92	188
D.C.	3	2	4	5	5	6	30	44	39	28	-
Va.	4	4	4	-	9	21	71	99	53	111	221
W. Va.	N	N	4	-	-	-	-	3	20	18	32
N.C.	4	5	1	2	7	5	287	245	130	117	136
S.C.	4	2	1	1	3	5	120	128	U	87	53
Ga.	-	-	2	1	13	12	171	221	U	152	45
Fla.	15	7	12	5	17	6	78	103	U	268	80
E.S. CENTRAL	11	10	15	23	9	12	376	670	-	406	95
Ky.	8	-	2	2	1	3	43	60	U	60	14
Tenn.	3	4	7	8	5	3	192	272	U	136	60
Ala.	-	2	6	2	3	3	80	166	U	137	21
Miss.	-	4	-	11	-	3	61	172	U	73	-
W.S. CENTRAL	8	5	3	2	9	7	253	432	38	770	68
Ark.	-	-	2	-	-	1	46	55	38	64	1
La.	-	1	-	1	3	4	102	138	-	48	-
Okla.	3	1	-	-	1	2	16	41	U	58	67
Tex.	5	3	1	1	5	-	89	198	U	600	-
MOUNTAIN	20	18	1	2	18	27	80	64	93	158	52
Mont.	1	1	-	-	-	2	-	-	2	2	16
Idaho	-	1	-	-	1	-	-	-	3	4	-
Wyo.	1	1	-	-	-	1	-	-	1	2	32
Colo.	4	4	-	-	6	12	4	2	U	35	-
N. Mex.	2	1	-	-	6	4	10	-	7	6	-
Ariz.	3	4	-	1	4	3	61	54	59	66	4
Utah	8	4	-	-	1	1	3	2	21	6	-
Nev.	1	2	1	1	-	4	2	6	U	37	-
PACIFIC	33	15	38	18	74	122	117	124	1,011	1,305	144
Wash.	3	3	1	-	6	4	6	6	U	103	-
Oreg.	-	-	3	7	7	7	2	3	U	44	-
Calif.	30	11	34	11	60	108	109	113	942	1,051	131
Alaska	-	-	-	-	-	2	-	1	15	31	13
Hawaii	-	1	-	-	1	1	-	1	54	76	-
Guam	-	-	-	-	-	-	-	3	-	13	-
P.R.	-	-	-	-	-	3	81	73	46	-	23
V.I.	-	-	-	-	-	-	-	-	-	-	-
Amer. Samoa	-	-	-	-	-	-	-	-	-	-	-
C.N.M.I.	-	-	-	-	-	-	1	5	8	-	-

N: Not notifiable U: Unavailable -: no reported cases

*Additional information about areas displaying "U" for cumulative 1998 Tuberculosis cases can be found in Notice to Readers, *MMWR* Vol. 47, No. 2, p. 39.

TABLE III. Provisional cases of selected notifiable diseases preventable by vaccination, United States, weeks ending May 9, 1998, and May 3, 1997 (18th Week)

Reporting Area	*H. influenzae*, invasive		Hepatitis (Viral), by type				Measles (Rubeola)					
			A		B		Indigenous		Imported†		Total	
	Cum. 1998*	Cum. 1997	Cum. 1998	Cum. 1997	Cum. 1998	Cum. 1997	1998	Cum. 1998	1998	Cum. 1998	Cum. 1998	Cum. 1997
UNITED STATES	392	422	7,034	9,276	2,526	3,014	-	3	-	10	13	46
NEW ENGLAND	23	23	97	233	29	64	-	-	-	1	1	1
Maine	2	3	10	26	-	3	-	-	-	-	-	-
N.H.	1	3	6	12	7	5	-	-	-	-	-	-
Vt.	2	-	7	5	-	1	-	-	-	-	-	-
Mass.	16	15	22	121	11	34	-	-	-	1	1	1
R.I.	2	1	8	17	11	6	-	-	-	-	-	-
Conn.	-	1	44	52	-	15	-	-	-	-	-	-
MID. ATLANTIC	59	53	418	852	359	470	-	-	-	1	1	11
Upstate N.Y.	24	3	123	93	106	79	-	-	-	-	-	4
N.Y. City	10	18	118	404	96	194	-	-	-	-	-	5
N.J.	23	20	84	132	60	90	-	-	-	-	-	1
Pa.	2	12	93	223	97	107	-	-	-	1	1	1
E.N. CENTRAL	53	66	841	1,176	249	583	-	-	-	2	2	6
Ohio	27	34	122	158	26	34	-	-	-	-	-	-
Ind.	9	5	66	111	20	39	U	-	U	1	1	-
Ill.	16	18	123	295	38	115	-	-	-	-	-	5
Mich.	-	9	475	532	157	179	-	-	-	1	1	1
Wis.	1	-	55	80	8	216	-	-	-	-	-	-
W.N. CENTRAL	29	23	635	661	114	193	-	-	-	-	-	10
Minn.	17	14	28	47	11	9	-	-	-	-	-	1
Iowa	1	2	307	86	17	12	-	-	-	-	-	-
Mo.	7	3	241	381	68	150	-	-	-	-	-	1
N. Dak.	-	-	2	7	2	1	-	-	-	-	-	-
S. Dak.	-	2	3	6	1	-	-	-	-	-	-	8
Nebr.	-	1	13	22	5	7	-	-	-	-	-	-
Kans.	4	1	41	112	10	14	-	-	-	-	-	-
S. ATLANTIC	89	78	622	472	360	387	-	1	-	5	6	2
Del.	-	-	1	10	-	3	-	-	-	1	1	-
Md.	24	31	132	112	48	65	-	-	-	1	1	1
D.C.	-	-	24	13	6	18	-	-	-	-	-	1
Va.	11	6	95	64	33	41	-	-	-	2	2	-
W. Va.	3	3	-	5	2	6	-	-	-	-	-	-
N.C.	11	12	36	68	77	86	-	-	-	-	-	-
S.C.	1	3	12	42	-	37	-	-	-	-	-	-
Ga.	18	16	116	43	59	38	U	-	U	1	1	-
Fla.	21	7	206	115	135	93	-	1	-	-	1	-
E.S. CENTRAL	21	25	132	254	156	219	-	-	-	-	-	1
Ky.	3	4	7	28	16	13	-	-	-	-	-	-
Tenn.	13	15	92	157	114	135	-	-	-	-	-	-
Ala.	5	6	33	37	26	28	-	-	-	-	-	1
Miss.	-	-	-	32	-	43	U	-	U	-	-	-
W.S. CENTRAL	23	19	1,200	1,411	383	190	-	-	-	-	-	4
Ark.	-	1	17	91	21	19	U	-	U	-	-	-
La.	11	3	13	75	9	41	-	-	-	-	-	-
Okla.	11	13	193	590	25	10	-	-	-	-	-	-
Tex.	1	2	977	655	328	120	-	-	-	-	-	4
MOUNTAIN	56	42	1,146	1,464	296	304	-	-	-	-	-	1
Mont.	-	-	19	43	3	4	-	-	-	-	-	-
Idaho	-	-	86	63	14	8	-	-	-	-	-	-
Wyo.	-	1	24	16	7	8	-	-	-	-	-	-
Colo.	11	5	91	170	36	60	-	-	-	-	-	-
N. Mex.	4	2	65	101	119	106	-	-	-	-	-	-
Ariz.	31	12	725	662	71	64	-	-	-	-	-	1
Utah	4	3	74	279	23	36	-	-	-	-	-	-
Nev.	6	19	63	120	22	18	U	-	U	-	-	-
PACIFIC	39	93	1,943	2,763	581	604	-	2	-	1	3	10
Wash.	2	1	373	195	46	19	-	-	-	-	-	-
Oreg.	24	17	140	134	46	44	-	-	-	-	-	-
Calif.	10	72	1,402	2,363	480	526	-	2	-	1	3	7
Alaska	1	1	9	15	4	10	-	-	-	-	-	-
Hawaii	2	2	19	56	5	5	-	-	-	-	-	3
Guam	-	-	-	-	-	1	U	-	U	-	-	-
P.R.	2	-	12	122	226	462	-	-	-	-	-	-
V.I.	-	-	-	-	-	-	U	-	U	-	-	-
Amer. Samoa	-	-	-	-	-	-	U	-	U	-	-	-
C.N.M.I.	-	4	-	1	7	20	U	-	U	-	-	1

N: Not notifiable U: Unavailable -: no reported cases

*Of 93 cases among children aged <5 years, serotype was reported for 47 and of those, 23 were type b.

†For imported measles, cases include only those resulting from importation from other countries.

TABLE III. (Cont'd.) Provisional cases of selected notifiable diseases preventable by vaccination, United States, weeks ending May 9, 1998, and May 3, 1997 (18th Week)

Reporting Area	Meningococcal Disease		Mumps			Pertussis			Rubella		
	Cum. 1998	Cum. 1997	1998	Cum. 1998	Cum. 1997	1998	Cum. 1998	Cum. 1997	1998	Cum. 1998	Cum. 1997
UNITED STATES	1,111	1,509	10	161	225	40	1,256	1,881	22	191	23
NEW ENGLAND	59	92	-	-	7	5	220	451	3	30	-
Maine	4	8	-	-	-	-	5	6	-	-	-
N.H.	1	9	-	-	-	-	19	54	-	-	-
Vt.	1	2	-	-	-	-	23	150	-	-	-
Mass.	27	52	-	-	2	5	167	224	-	4	-
R.I.	3	5	-	-	4	-	-	12	-	-	-
Conn.	23	16	-	-	1	-	6	5	3	26	-
MID. ATLANTIC	114	147	-	6	29	4	152	171	8	88	9
Upstate N.Y.	29	33	-	3	4	4	95	59	8	88	1
N.Y. City	13	25	-	-	1	-	-	43	-	-	8
N.J.	33	30	-	-	4	-	-	9	-	-	-
Pa.	39	59	-	3	20	-	57	60	-	-	-
E.N. CENTRAL	147	219	-	24	30	-	138	194	-	-	3
Ohio	58	81	-	11	9	-	53	57	-	-	-
Ind.	25	22	U	2	4	U	40	19	U	-	-
Ill.	32	74	-	1	9	-	10	26	-	-	-
Mich.	15	20	-	10	7	-	18	28	-	-	-
Wis.	17	22	-	-	1	-	17	64	-	-	3
W.N. CENTRAL	94	112	-	16	7	1	97	104	-	2	-
Minn.	16	17	-	9	3	-	58	63	-	-	-
Iowa	14	22	-	5	3	1	17	7	-	-	-
Mo.	38	56	-	1	-	-	9	17	-	1	-
N. Dak.	-	-	-	1	-	-	-	2	-	-	-
S. Dak.	6	3	-	-	-	-	4	1	-	-	-
Nebr.	4	4	-	-	1	-	3	2	-	-	-
Kans.	16	10	-	-	-	-	6	12	-	1	-
S. ATLANTIC	192	247	7	29	33	3	97	164	-	5	1
Del.	1	4	-	-	-	-	-	-	-	-	-
Md.	18	26	-	-	4	1	19	68	-	-	-
D.C.	-	5	-	-	-	-	1	2	-	-	-
Va.	19	23	-	4	4	-	6	18	-	-	-
W. Va.	5	9	-	-	-	-	1	3	-	-	1
N.C.	25	41	-	6	6	-	40	35	-	3	-
S.C.	30	34	1	4	7	-	10	8	-	1	-
Ga.	40	47	U	1	4	U	1	2	U	-	-
Fla.	54	58	6	14	8	2	19	28	-	1	-
E.S. CENTRAL	79	105	-	-	13	-	34	37	-	-	-
Ky.	13	27	-	-	2	-	15	10	-	-	-
Tenn.	35	33	-	-	3	-	9	12	-	-	-
Ala.	31	29	-	-	4	-	10	9	-	-	-
Miss.	-	16	U	-	4	U	-	6	U	-	-
W.S. CENTRAL	123	145	-	22	27	5	68	35	11	51	1
Ark.	14	22	U	-	-	U	8	2	U	-	-
La.	24	28	-	1	7	-	-	7	-	-	-
Okla.	21	14	-	-	-	-	6	5	-	-	-
Tex.	64	81	-	21	20	5	54	21	11	51	1
MOUNTAIN	68	88	-	14	11	7	279	463	-	5	-
Mont.	2	5	-	-	-	-	1	2	-	-	-
Idaho	3	5	-	1	2	2	131	298	-	-	-
Wyo.	3	-	-	1	1	-	7	3	-	-	-
Colo.	16	27	-	2	2	-	43	114	-	-	-
N. Mex.	12	15	N	N	N	5	55	21	-	1	-
Ariz.	22	16	-	4	-	-	22	9	-	1	-
Utah	7	11	-	1	3	-	13	2	-	2	-
Nev.	3	9	U	5	3	U	7	4	U	1	-
PACIFIC	235	364	3	50	68	15	171	272	-	10	9
Wash.	26	43	-	4	5	15	101	129	-	8	-
Oreg.	45	70	N	N	N	-	8	10	-	-	-
Calif.	159	238	3	32	49	-	58	127	-	1	4
Alaska	1	1	-	2	4	-	-	2	-	-	-
Hawaii	4	2	-	12	10	-	4	4	-	1	5
Guam	-	1	U	-	1	U	-	-	U	-	-
P.R.	2	6	-	2	4	-	2	-	-	-	-
V.I.	-	-	U	-	-	U	-	-	U	-	-
Amer. Samoa	-	-	U	-	-	U	-	-	U	-	-
C.N.M.I.	-	-	U	-	1	U	-	-	U	-	-

N: Not notifiable U: Unavailable -: no reported cases

TABLE IV. Deaths in 122 U.S. cities,* week ending May 9, 1998 (18th Week)

Reporting Area	All Causes, By Age (Years)						P&I† Total
	All Ages	>65	45-64	25-44	1-24	<1	
NEW ENGLAND	484	347	87	34	8	8	43
Boston, Mass.	125	83	30	6	2	4	14
Bridgeport, Conn.	29	19	7	2	1	-	2
Cambridge, Mass.	22	18	3	-	-	1	2
Fall River, Mass.	22	20	2	-	-	-	-
Hartford, Conn.	52	39	6	6	1	-	3
Lowell, Mass.	19	16	2	1	-	-	2
Lynn, Mass.	11	8	3	-	-	-	2
New Bedford, Mass.	24	22	2	-	-	-	-
New Haven, Conn.	30	20	5	3	1	1	2
Providence, R.I.	U	U	U	U	U	U	U
Somerville, Mass.	9	6	-	3	-	-	1
Springfield, Mass.	51	34	11	3	2	1	6
Waterbury, Conn.	32	23	6	2	-	1	3
Worcester, Mass.	58	39	10	8	1	-	6
MID. ATLANTIC	2,123	1,492	410	160	29	32	120
Albany, N.Y.	43	32	11	-	-	-	2
Allentown, Pa.	21	17	4	-	-	-	-
Buffalo, N.Y.	52	40	5	2	1	4	12
Camden, N.J.	U	U	U	U	U	U	U
Elizabeth, N.J.	18	12	4	2	-	-	-
Erie, Pa.	51	45	4	2	-	-	2
Jersey City, N.J.	44	28	5	8	-	3	-
New York City, N.Y.	1,109	762	225	88	16	18	51
Newark, N.J.	69	37	17	13	1	1	4
Paterson, N.J.	28	15	7	5	1	-	-
Philadelphia, Pa.	299	212	62	16	6	3	18
Pittsburgh, Pa.§	50	31	12	4	2	1	5
Reading, Pa.	22	18	2	2	-	-	4
Rochester, N.Y.	134	100	24	9	-	1	8
Schenectady, N.Y.	26	19	5	1	1	-	2
Scranton, Pa.	32	24	4	4	-	-	1
Syracuse, N.Y.	83	68	11	3	-	1	7
Trenton, N.J.	28	19	7	1	1	-	4
Utica, N.Y.	14	13	1	-	-	-	-
Yonkers, N.Y.	U	U	U	U	U	U	U
E.N. CENTRAL	1,863	1,257	359	140	47	59	124
Akron, Ohio	49	30	7	2	2	8	-
Canton, Ohio	40	34	3	1	1	1	6
Chicago, Ill.	425	261	98	40	15	10	44
Cincinnati, Ohio	112	74	22	8	3	5	16
Cleveland, Ohio	140	93	26	11	4	6	3
Columbus, Ohio	154	100	29	15	1	9	11
Dayton, Ohio	33	24	6	2	-	1	1
Detroit, Mich.	192	118	41	20	7	6	6
Evansville, Ind.	43	31	8	4	-	-	-
Fort Wayne, Ind.	67	50	11	1	3	2	2
Gary, Ind.	9	4	4	-	1	-	-
Grand Rapids, Mich.	70	60	4	1	3	2	9
Indianapolis, Ind.	190	127	40	17	4	2	-
Lansing, Mich.	44	33	7	3	-	1	4
Milwaukee, Wis.	123	88	24	4	2	5	11
Peoria, Ill.	U	U	U	U	U	U	U
Rockford, Ill.	50	36	11	3	-	-	5
South Bend, Ind.	45	31	6	7	1	-	2
Toledo, Ohio	U	U	U	U	U	U	U
Youngstown, Ohio	77	63	12	1	-	1	4
W.N. CENTRAL	646	435	104	45	24	24	39
Des Moines, Iowa	60	39	12	5	4	-	3
Duluth, Minn.	25	17	2	1	-	1	2
Kansas City, Kans.	16	12	1	1	1	1	-
Kansas City, Mo.	105	70	12	6	6	1	3
Lincoln, Nebr.	44	28	7	7	1	1	3
Minneapolis, Minn.	113	80	20	8	2	3	7
Omaha, Nebr.	66	48	10	3	2	3	8
St. Louis, Mo.	86	45	22	7	5	7	8
St. Paul, Minn.	92	69	12	3	2	6	3
Wichita, Kans.	39	27	6	4	1	1	2
S. ATLANTIC	970	625	211	80	25	27	47
Atlanta, Ga.	U	U	U	U	U	U	U
Baltimore, Md.	185	113	44	21	4	3	17
Charlotte, N.C.	87	58	20	6	2	1	9
Jacksonville, Fla.	129	78	32	14	2	3	-
Miami, Fla.	107	70	20	13	2	2	-
Norfolk, Va.	50	34	11	1	3	1	4
Richmond, Va.	59	34	14	6	1	4	-
Savannah, Ga.	59	35	20	3	-	1	4
St. Petersburg, Fla.	35	29	3	-	3	-	4
Tampa, Fla.	148	108	23	6	5	4	7
Washington, D.C.	100	63	18	8	3	8	2
Wilmington, Del.	11	3	6	2	-	-	-
E.S. CENTRAL	593	403	113	43	19	13	36
Birmingham, Ala.	171	113	30	17	5	4	14
Chattanooga, Tenn.	49	30	14	2	3	-	2
Knoxville, Tenn.	83	56	21	5	1	-	1
Lexington, Ky.	48	36	8	1	3	-	3
Memphis, Tenn.	U	U	U	U	U	U	U
Mobile, Ala.	71	58	9	1	1	2	2
Montgomery, Ala.	43	31	8	2	1	1	2
Nashville, Tenn.	128	79	23	15	5	6	12
W.S. CENTRAL	1,231	824	249	88	32	38	69
Austin, Tex.	82	46	24	7	3	2	2
Baton Rouge, La.	45	31	8	2	-	4	-
Corpus Christi, Tex.	51	38	7	2	1	3	3
Dallas, Tex.	162	89	51	11	5	6	4
El Paso, Tex.	57	40	9	8	-	-	3
Ft. Worth, Tex.	92	71	10	7	2	2	11
Houston, Tex.	229	152	44	17	7	9	7
Little Rock, Ark.	102	66	16	6	5	9	6
New Orleans, La.	126	79	29	15	3	-	-
San Antonio, Tex.	182	127	37	11	5	2	20
Shreveport, La.	U	U	U	U	U	U	U
Tulsa, Okla.	103	85	14	2	1	1	13
MOUNTAIN	879	605	156	79	22	16	52
Albuquerque, N.M.	80	59	14	5	1	1	3
Boise, Idaho	36	25	7	4	-	-	2
Colo. Springs, Colo.	59	36	7	9	5	2	2
Denver, Colo.	104	72	18	10	2	2	9
Las Vegas, Nev.	175	115	42	14	1	3	11
Ogden, Utah	23	18	1	3	1	-	4
Phoenix, Ariz.	156	101	29	16	4	6	8
Pueblo, Colo.	32	24	5	3	-	-	3
Salt Lake City, Utah	93	61	17	8	5	2	5
Tucson, Ariz.	121	94	16	7	3	-	5
PACIFIC	1,200	843	227	79	28	23	112
Berkeley, Calif.	8	6	2	-	-	-	-
Fresno, Calif.	60	42	10	5	1	2	-
Glendale, Calif.	U	U	U	U	U	U	U
Honolulu, Hawaii	74	54	12	7	-	1	7
Long Beach, Calif.	67	49	12	4	2	-	12
Los Angeles, Calif.	U	U	U	U	U	U	U
Pasadena, Calif.	31	25	5	-	1	-	5
Portland, Oreg.	U	U	U	U	U	U	U
Sacramento, Calif.	140	99	23	7	5	6	24
San Diego, Calif.	143	97	31	9	4	2	12
San Francisco, Calif.	124	83	24	12	4	1	12
San Jose, Calif.	213	135	44	20	8	6	14
Santa Cruz, Calif.	31	26	4	1	-	-	8
Seattle, Wash.	154	106	36	6	2	4	9
Spokane, Wash.	58	45	10	2	1	-	5
Tacoma, Wash.	97	76	14	6	-	1	4
TOTAL	9,989¶	6,831	1,916	748	234	240	642

U: Unavailable -: no reported cases

*Mortality data in this table are voluntarily reported from 122 cities in the United States, most of which have populations of 100,000 or more. A death is reported by the place of its occurrence and by the week that the death certificate was filed. Fetal deaths are not included.

†Pneumonia and influenza.

§Because of changes in reporting methods in this Pennsylvania city, these numbers are partial counts for the current week. Complete counts will be available in 4 to 6 weeks.

¶Total includes unknown ages.

Quarterly Immunization Table

To track progress toward achieving the goals of the Childhood Immunization Initiative (CII), CDC publishes quarterly a tabular summary of the number of cases of nationally notifiable diseases preventable by routine childhood vaccination reported during the previous quarter and year-to-date (provisional data). In addition, the table compares provisional data with data for the previous year and highlights the number of reported cases among children aged <5 years, who are the primary focus of CII. Data in the table are reported through the National Electronic Telecommunications System for Surveillance (NETSS).

Number of reported cases of diseases preventable by routine childhood vaccination — United States, January–March 1998 and January–March 1997*

Disease	No. cases, January–March	Total cases January–March		No. cases among children aged <5 years† January–March	
	1998	1997	1998	1997	1998
Congenital rubella syndrome	0	2	0	2	0
Diphtheria	0	1	0	0	0
Haemophilus influenzae§	255	283	255	56	55
Hepatitis B¶	1497	1941	1497	52	19
Measles	7	17	7	9	5
Mumps	98	126	98	25	16
Pertussis	807	1101	807	438	332
Poliomyelitis, paralytic**	0	0	0	0	0
Rubella	98	9	98	3	4
Tetanus	2	8	2	0	1

*Data for 1997 and 1998 are provisional.

†For 1997 and 1998, age data were available for ≥97% cases.

§Invasive disease; *H. influenzae* serotype is not routinely reported to the National Notifiable Diseases Surveillance System. Of 55 cases among children aged <5 years, serotype was reported for 22 cases, and of those, 12 were type b, the only serotype of *H. influenzae* preventable by vaccination.

¶Because most hepatitis B virus infections among infants and children aged <5 years are asymptomatic (although likely to become chronic), acute disease surveillance does not reflect the incidence of this problem in this age group or the effectiveness of hepatitis B vaccination in infants.

**Two cases with onset in 1997 have been confirmed; two suspected cases are under investigation, of which one is in a child aged <5 years. One suspected case in a child aged <5 years with onset in 1998 is also under investigation.

The *Morbidity and Mortality Weekly Report (MMWR)* Series is prepared by the Centers for Disease Control and Prevention (CDC) and is available free of charge in electronic format and on a paid subscription basis for paper copy. To receive an electronic copy on Friday of each week, send an e-mail message to *listserv@listserv.cdc.gov*. The body content should read *SUBscribe mmwr-toc*. Electronic copy also is available from CDC's World-Wide Web server at *http://www.cdc.gov/* or from CDC's file transfer protocol server at *ftp.cdc.gov*. To subscribe for paper copy, contact Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; telephone (202) 512-1800.

Data in the weekly *MMWR* are provisional, based on weekly reports to CDC by state health departments. The reporting week concludes at close of business on Friday; compiled data on a national basis are officially released to the public on the following Friday. Address inquiries about the *MMWR* Series, including material to be considered for publication, to: Editor, *MMWR* Series, Mailstop C-08, CDC, 1600 Clifton Rd., N.E., Atlanta, GA 30333; telephone (888) 232-3228.

☆U.S. Government Printing Office: 1998-633-228/67078 Region IV

DEPARTMENT OF
HEALTH AND HUMAN SERVICES
Centers for Disease Control
and Prevention (CDC)
Atlanta, Georgia 30333

Official Business
Penalty for Private Use $300
Return Service Requested

9602 93036 M3876
UNIVERSITY MICROFILMS
SERIALS ACQUISITION DEPT
300 NORTH ZEEB ROAD
ANN ARBOR MI 48103-1553

0001

FIRST-CLASS MAIL
POSTAGE & FEES PAID
PHS/CDC
Permit No. G-284